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Study of Montana Erysiphææ.

F. D. KELSEY.

In the author's experience, a wide difference exists in Montana as to the relative quantity of the *Erysiphææ* and the *Uredineæ*, the latter being by far the more numerous and on a wider range of hosts; but the *Erysiphææ*, where they do occur, are beautiful in form, abundant on the hosts, and marked in perfection of development.

ERYSIPHE LINKII Lév. Found on our prominent and abundant *Artemisia Ludoviciana* Nutt. I obtained these plants in Helena, Montana, September 17, 1888, and also in September, 1889. A careless observer would not see the fungus at all, or mistake it for particles of dust. It is evident enough in herbarium specimens, but the whole appearance of the host is such as to make it hard to see the fungus on the living plant. The identification of this species was made by Mr. E. W. D. Holway, of Decorah, Iowa, to whom the author owes a debt of gratitude for kindness and attention.

ERYSIPHE COMMUNIS (Wallr.) Fr. (1) On *Aster commutatus* Gray, September, 1888, at Helena. This host has been doubted by one eminent botanist and reaffirmed by another. If it be not *A. commutatus* it comes far too near to be separated into even a good variety, unless botanists are willing to multiply species. Whether the fungus be abundant can not now be told. Only once have I collected it on this host, and then obtained but a few inferior specimens. (2) On *Ranunculus Cymbalaria* Pursh. This host is an abundant one in Montana, and is most richly covered with the fungus in September and October. The host grows only a few inches in height, and always in damp places, thus inviting most genially the visits of the fungus. (3) On *Geranium Richardsoni* Fisch. & Mey. This specimen was collected at Sand Coulee by my friend, Mr. F. W. Anderson. The perithecia are very few, an unusual and possibly accidental matter. (4) On *Gutierrezia Euthamiae* Torr. & Gray. This specimen was also found by Mr. Anderson, and its date is remarkably early, July 27, 1888. The host is but slightly affected, and no eye but that of a skilled observer would ever have seen the fungus, yet it is on both stem and leaves. (5) On *Lupinus parviflorus* Nutt. Perithecia abun-

dant and very evident, tending to greater abundance on the upper side of the leaves; development late. This specimen was collected at Deer Lodge, in October, 1888. (6) On *Oenothera albicaulis* Nutt. It develops early. The only specimen I ever saw was sent me by Mr. F. W. Anderson, collected at Sand Coulee, July 24, 1888. It is conspicuous, fairly covering some of the leaves, as on *Ranunculus Cymbalaria*. (7) My 1888 list calls for this fungus on *Amelanchier alnifolia* Nutt., but the paper has been lost. Some of my correspondents will have it, marked $\frac{88}{109}$. (8) This year this fungus has been remarkably abundant on *Astragalus Canadensis* L. It came early, even in August, and is still developing the last of September. Both sides of the leaflets are as black with perithecia as if painted. (9) *Ranunculus sceleratus* L. But a very small amount of this has been obtained.

Erysiphe sepulta E. & E. n. sp. This species is so named only provisionally, and may yet prove to be only an old species under peculiar circumstances. It grows on the leaves and stems of *Bigelovia graveolens* var. *albicaulis* Gray. Found in September and October and even in November, at Helena. It comes so near to *E. cichoracearum* that it may well be doubted if it be a new species; but the perithecia appear embedded in the woolly coat of the host. If after further study this can be proved to be a constant distinction, Ellis and Everhart will publish it as one of my new species.

ERYSIPHE CICHORACEARUM DC. (1) On *Solidago serotina* Ait. Abundant in September. Perithecia deeply colored brown and very abundant, with a most decided preference for the upper surface of the leaves. Most of my hosts are clean on the underside, revealing under the glass a perithecium here and there, but usually not to be seen with the unaided eye. (2) On *Aster laevis* L., September, 1888. Much like that on *Solidago serotina*. Not seen in 1889. (3) On *Bigelovia Douglasii* Gray. This host grows abundantly around Helena, yet I have never seen the fungus on any of our *B. Douglasii*. Mr. F. W. Anderson obtained my specimen in October 1888, on the McCarthy Mountains, near Willis. This specimen shows mycelium scarce, with comparatively abundant perithecia. Mr. Anderson marked the identification with an interrogation. Examination reveals the asci suspiciously elongated in comparison with the width; otherwise it is as *E. cichoracearum*. (4) On *Aster foliaceus* var. *Eatonii* Gray. Collected by Mr. F. W. Anderson on

banks of the Missouri river, September, 1888. (5) On *Artemisia Ludoviciana* Nutt. Sent by Mr. Anderson; but on examination I see no difference from the specimens of mine identified by Mr. Holway as *E. Linkii*. (6) On *Erigeron glabellus*? Elkhorn, Montana, September 10, 1889. The fungus was rather immature, growing on a high mountain peak, on a host too far gone for sure identification of species, but which looked like a dry season mountain form of *Erigeron glabellus*. (7) On *Helianthus annuus* L., Helena, September 2, 1889. The fungus covered the host on both leaf surfaces. The host grew on a damp spot along a railroad. (8) On *Helianthus Californicus* var. *Utahensis* Gray, leg. F. W. Anderson. Host black on both leaf surfaces with the fungus. Collected September 2, 1889. (9) On *Aster* sp., Bozeman, June 20, 1889, by Mrs. M. L. Alderson. Remarkable for its exceedingly early date. (10) On *Verbena hastata* L., Helena, September 2, 1889. Exceedingly abundant on its host, appearing first and ripening on the lower leaf surface, and then spreading to the upper. (11) On *Cnicus undulatus* var. *canescens* Gray, Helena, September 2, 1889. Abundant. When collected I took it for a Puccinia. (12) On *Stachys palustris* L., August 26, 1889, Helena. This seems, from statements in *Ill. State Lab. Bulletin* ii. art. vi., as though it ought to be *E. galeopsidis*, but I can not find the haustoria lobed. (13) On *Phacelia circinata* Jacq. f., Silver City, July 8, 1889. Fungus rather too immature for certainty, yet every indication is that it belongs here. I have never seen it before upon this host. It grew beside a damp meadow. (14) On *Echinosperrum Redowski* Lehm., July, 1889, Helena. Fungus parse and rather too young. Appeared to affect the host very materially.

ERYSIPHE GRAMINIS DC. Of this fungus there are two specimens in my herbarium, both obtained by Mr. Anderson in Northern Montana, one upon *Poa tenuifolia* Nutt., Sand Coulee, July, 1888; and the other upon *Agropyrum glaucum* R. & S., leg. F. W. Anderson, Great Falls, August, 1888.

UNCINULA SALICIS (DC) Winter. On *Salix flavescens* Nutt., September, 1888. Exceedingly abundant in 1888, but very scarce in 1889, possibly because of the extreme dryness this year and the early severe frosts. On *Populus tremuloides* Michx., September, 1888, it covered the leaves on the upper side. While this fungus is so common the world over, it never fails to interest the student by its beauty and abundance of perithecia. I have it from Prof. A. B. Seymour,

collected August 30, 1884, in Dakota, on *Salix flavescens*; and September 8, 1884, at Bozeman, on *Salix rostrata* Richardson.

PHYLLACTINIA SUFFULTA (Reb.) Sacc. (1) On *Cornus stolonifera* Michx., collected at Helena, September 7, 1888. Its habit is opposite to that of *Uncinula*, for it grows almost exclusively on the underside of leaves. A hand lens will show here and there an isolated perithecium on the upper surface, while the lower will be one mass of perithecia. (2) On *Betula* sp., Helena, October 1, 1888. The same general habit as noticed on *Cornus*, but not so abundant.

PODOSPHÆRA OXYCANTHÆ (DC.) DBy. On *Prunus Virginiana* L., Helena, September 17, 1888. Mycelium persistent, evident; perithecia dark brown and exceedingly abundant, sometimes almost covering the entire leaf on both sides. In 1889 no signs of it have been observed on the same trees which bore it so richly in 1888.

SPHÆROTHECA MORS-UVÆ (Schw.) B. & C. On *Ribes floridum* L., October 8, 1888. As yet this fungus on this host has proven exceedingly scarce, yet no apparent reason has been observed.

In the study of Montana fungi I would acknowledge my indebtedness to Messrs. Ellis, Holway and Anderson.

Helena, Montana.

BRIEFER ARTICLES.

The policy of the trustees of the Missouri Botanical Garden.—At a recent meeting the trustees of the garden adopted the following outline of general policy to be pursued in the development of the important institution left to their charge:

To maintain or even augment the present ornamental features of the garden.

To add to the botanical usefulness and interest of the collection by the introduction of American plants, so that, other things being equal, these shall ultimately be largely represented, and may even preponderate outside of the green-houses, giving then in the garden an epitome of the characteristics of our native flora.

To carry into execution, as rapidly as possible, a system of correctly naming and labeling all plants in the grounds with the exception of such as may be used in ribbon-gardening or for other exclusively ornamental purposes.

To provide fire-proof quarters for the invaluable herbarium of the